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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT PAPER NUMBER

1763

DATE MAILED: 07/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,844

Applicant(s)

IZUTA, TAKASHI

Examiner

Rakesh K. Dhingra

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 9-16 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended independent claims 9, 13.

Reference (US Patent No. 5,421,905, Ueno et al) when combined with Uehara et al (US Patent No. 6,767,840) and Padhi et al (US PG PUB No. 2003/0209523) reads on claim 9, 13 limitations. Accordingly claims 9, 13 and dependent claims 10-12, 14-16 have been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9, 10, 12 –14, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uehara et al (US Patent No. 6,767,840) in view of Ueno et al (US Patent No. 5,421,905) and Padhi et al (US PG PUB No. 2003/0209523).

Regarding Claim 9: Uehara et al teach a substrate treating apparatus (Figure 1, 2) for performing a predetermined treatment of a plurality of substrates as immersed in a heated treating solution, comprising:

a wafer processing bath (treating tank) 10 for storing the heated treating solution;

Art Unit: 1763

a wafer holder (substrate holding device) 41 for holding the substrates received from a substrate transport mechanism and a wafer rotating mechanism 52-59 for rotating and moving (immersing) the substrates 40 in the heated treating solution stored in said treating tank (Column 5, line 5 to Column 6, line 45).

Uehara et al do not teach substrate transport mechanism and a controller which keeps said substrate holding device on standby in the heated treating solution stored in said treating tank to preheat said substrate holding device, and when the plurality of substrates are transported by said substrate transport mechanism to said treating tank-raises said substrate holding device from said treating tank to receive the plurality of substrates from said substrate transport mechanism and lowers said substrate holding device having received the plurality of substrates to immerse the substrates in the heated treating solution in the treating tank thereby to treat the substrates.

Ueno et al teach a wafer treating apparatus (Figures 1-3) that includes a case (chamber) 30, washing vessels 20, 21, 23, 24, elevator means 33a (substrate transport mechanism) 31a that can transport a plurality of substrates W into and out of tanks 20, 21, 23, 24 by a boat (substrate holding device) 32 that is movable up and down [Column 2, line 60 to Column 3, line 61].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use substrate transport mechanism and substrate holder movement mechanism as taught by Ueno et al in the apparatus of Uehara et al to facilitate movement of substrates into and out of treating tanks.

Art Unit: 1763

Uehara et al in view of Ueno et al do not teach controller which keeps said substrate holding device on standby in the heated treating solution stored in said treating tank to preheat said substrate holding device, and when the plurality of substrates are transported by said substrate transport mechanism to said treating tank- raises said substrate holding device from said treating tank to receive the plurality of substrates from said substrate transport mechanism and lowers said substrate holding device having received the plurality of substrates to immerse the substrates in the heated treating solution in the treating tank thereby to treat the substrates.

Padhi et al teach a wafer processing apparatus (Figures 1, 2) that includes a wafer control system 222 (control part) that controls the functions of each component (includes substrate holding device) in the system and comprises a programmable microprocessor that uses software specifically designed to control all components (includes substrate holding device) in the system as per process requirements (Paragraph 0035). It would be obvious to use such controller with programmable microprocessor (loaded with the program having the required process steps) to execute and control the wafer treating process (including keeping substrate holding device on standby in the heated treating solution stored in said treating tank to preheat said substrate holding device, to receive the plurality of substrates from substrate transport mechanism and lower the substrate holding device having received the plurality of substrates to immerse the substrates in the heated treating solution in the treating tank thereby to treat the substrates.

Art Unit: 1763

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a control system (control part) as taught by Padhi et al in the apparatus of Uehara et al in view of Ueno et al to provide automated control of process as per process requirements.

Regarding Claims 10,12: Uehara et al teach that apparatus can carry out etching of silicon nitride layer using hot phosphoric acid (Column 11, lines 30-40).

Regarding Claim 13: Uehara et al teach a substrate treating apparatus (Figure 1, 2) for performing a predetermined treatment of a plurality of substrates as immersed in a heated treating solution, comprising:

a wafer processing bath (treating tank) 10 for storing the heated treating solution;
a wafer holder (substrate holding device) 41 for holding the substrates received from a substrate transport mechanism and a wafer rotating mechanism 52-59 for rotating and moving (immersing) the substrates 40 in the heated treating solution stored in said treating tank (Column 5, line 5 to Column 6, line 45).

Uehara et al do not teach the apparatus has a substrate holder with rods that are supported in cantilever fashion, substrate heating device in the back plate and substrate transport mechanism.

Ueno et al teach a wafer treating apparatus (Figure 1, 2) that includes a case 30 washing vessels 20, 21, 23, 24, a boat 32 and a wafer fork (substrate holding device with back plate) 41 that includes support rods (holding rods) 43 for holding substrates W and where the holding rods are supported in a cantilever fashion (Figure 9). Ueno et al also teach substrate transport mechanism comprising of elevator means 33a, arm 33

Art Unit: 1763

(Figure 2) for supporting and moving wafer boat 32. Ueno et al further teach a IR heater (heating device) 52 that extends along support rods 43 (that are part of support assembly). Ueno et al also teach that orientation of IR heater 52 can be changed and thus heating device could be placed close to wafer fork (back plate) [Column 2, line 60 to Column 4, line 65].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use substrate holding and transport mechanism as taught by Ueno et al in the apparatus of Uehara et al to facilitate movement of substrates into and out of treating tanks.

Uehara et al in view of Ueno et al do not teach a controller which controls the treatment of the substrates by immersing said substrate holding device holding the substrates in the heated treating solution stored in said treating tank and the controller further preheats said back plate by means of said heating device before the treatment of the substrates.

Padhi et al teach a wafer processing apparatus (Figures 1, 2) that includes a wafer control system 222 (control part) that controls the functions of each component (includes substrate holding device) in the system and comprises a programmable microprocessor that uses software specifically designed to control all components (includes substrate holding device) in the system as per process requirements (Paragraph 0035). It would be obvious to use such controller with programmable microprocessor (loaded with the program having the required process steps) to execute and control the wafer treating process (including immersing said substrate holding

Art Unit: 1763

device holding the substrates in the heated treating solution stored in said treating tank and further preheat the back plate by means of said heating device before the treatment of the substrates.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a control system (control part) as taught by Padhi et al in the apparatus of Uehara et al in view of Ueno et al to provide automated control of process as per process requirements.

Regarding Claims 14, 16: Uehara et al teach that apparatus can carry out etching of silicon nitride layer using hot phosphoric acid (Column 11, lines 30-33).

Claims 11, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uehara et al (US Patent No. 6,767,840) in view of Ueno et al (US Patent No. 5,421,905) and Padhi et al (US PG PUB No. 2003/0209523) as applied to Claims 9, 13 and further in view of Chau et al (US PG PUB No. 2003/0132480).

Regarding Claims 11, 15: Uehara et al in view of Ueno et al and Padhi et al teach all limitations of the claim except that heat treating solution is sulphuric acid.

Chau et al teach (Figure 5) that that wet etch process can be done using hot sulphuric acid to strip resist layers from substrate (Paragraph 0023).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use sulphuric acid for wet etching as taught by Chau et al in the apparatus of Uehara et al in view of Ueno et al and Padhi et al to enable stripping of photo resist layers.

Conclusion

Art Unit: 1763

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Kuroda et al (US Patent No. 6,761,178) teach an apparatus (Figures 1-5) that includes loader/unloader part 6, cleaning/drying part 7, wafer chucks 20a, 20b and a controller 63 connected to a main controller 65 that controls complete processing of the apparatus.

Aruga et al (US patent No. 6,251,232) teach an apparatus (Figure 1) substrate holders 90 which can be preheated in preheating chamber 4.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

Art Unit: 1763

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



Parviz Hassanzadeh
Supervisory Patent
Examiner Art Unit 1763